# PRELIMINARY DRAFT LIST OF INCONSISENCIES IN REVISED FS SECTION 3

This memorandum contains a preliminary draft list inconsistencies in EPA's Portland Harbor Site (Site) Revised FS Section 3 dated July 29, 2015. This list is based on the Lower Willamette Group's (LWG) preliminary review of Section 3, and additional inconsistencies may be discovered with the LWG's full review.

1. **Technology Assignments and Area/Volume Estimates –**

    a. **Inconsistent Technology Assignments -** Figures 3.3-27 and 3.6-02 through 07 show different technology assignments in a number of intermediate to shallow areas throughout the Site. This error was discussed in the August 13, 2015 conference call.

    b. **Technology Decisions Inconsistent** - EPA indicates in the text for shallow areas that, "Contaminated sediment will be dredged to the lesser of the RAL concentrations or a maximum depth of 5 feet, and the dredged material will be replaced with an engineered cap to previous elevation. Otherwise, the contaminated sediment will be dredged 3 feet and replaced with an engineered cap." However, the shallow area decision tree figure shows that for the "otherwise" step that areas dredged to 3 feet that are not PTW that is not reliably contained might be assigned either an engineered cap or a reactive cap depending on whether they are in a groundwater plume area.

    c. **Inconsistent Alternative Quantities** – Inconsistencies in quantities were noted between text and tables and between various tables. For illustration purposes, examples of such inconsistencies are noted here for Alternative B only, but similar inconsistencies appear to exist with all the alternatives.

        i. Table 3.3-6 gives the total dredging area as 59 acres, whereas the dredging areas in Table 3.6-1, Table 3.6-2, and Table 3.7-2 each equal 81 acres.
        ii. There are inconsistencies between material volumes given in Table 3.6-3 and Table 3.7-2. For example, the required volume of sand for Alternative B is given in Table 3.6-3 as 247,470 cubic yards, while the volume of sand given in Table 3.7-2 is 244,750 cubic yards. Additionally, the mass of activated carbon indicated in Table 3.6-3 and Table 3.7-2 as and 5,190 and 2,390 tons, respectively.
        iii. Section 3.6.3 text states that the total capping areas is 21 acres, as does Table 3.7-2. However, in Table 3.6-2, the capping area is given as 9 acres and the dredge/cap area is given as 5 acres (and the two combined do not add up to 21 acres). This could possibly indicate that riverbank capping is not included in Table 3.6.3, since Section 3.6.4.5 indicates 11 acres of riverbank capping, but either way the numbers do not add up to 21 acres.
        iv. Section 3.6.3.2 states that "The estimated area to be dredged is 14 acres." However, the three bullets below that text state that "12 acres are dredged to 0-5 feet, 2 acres are dredged to 5-10 feet, and 0.1 acre is dredged to 10-

15 feet" for a total of 14.1 acres. And then another sentence in the same section states that, "In the areas dredged, 14 acres are covered with a reactive residual layer and 0.4 acres is covered with a residual sand layer." for a total of 14.4 acres.

v. Section 3.6.3.3 states that the estimated area to be dredged in intermediate areas is either 23 acres, 22 acres, or 22.1 acres.
vi. Section 3.6.3.3 also states that, "The area estimated to be capped is 9 acres: 5 acres of armored reactive cap, 1 acre of reactive cap, 3 acres of armored cap, and 1 acre engineered cap." (The individual types of caps add up to a total area of 10 acres.)
vii. Section 3.6.3.4 states that the estimated area to dredged in shallow areas is either 14 acres, 13.5 acres, or 15.62 acres.
viii. Section 3.6.3 indicates that for the entire Alternative B "ex-situ treatment of 240,840 to 321,120 cy" will occur. Section 3.6.3.3 indicates for Alternative B that ex-situ treatment is assumed for "273,440 to 364,590 cy of the dredge material" in intermediate areas only. Also, summing the individual areas of ex-situ treatment for the navigation channel, FMD areas, intermediate areas, and shallow areas give a total volume ranging between 514,940 cy to 686,590 cy which is more than twice stated in Section 3.6.3 as the total volume of ex-situ treatment for Alternative B.
ix. Not all of the area assigned to each technology in Section 3.6.3 is accounted for in subsequent sections. Sections 3.6.3.1-4 only describes 10 of the 103 total acres designated for EMNR for Alternative B in Section 3.6.3. Additionally, while Section 3.6.3 states that 15.3 acres of organoclay mats are needed for Alternative B, the only mention of organoclay mats in the subsequent sections are 0.9 acres required for the riverbank.
x. "Significantly augmented reactive cap" areas are listed in Table 3.6-1 but are not discussed in the text.
xi. The total construction area for Alternative B is given as 200 acres in Table 3.7-2 and 3.7-3. However, the sum of the areas as presented in these same tables (and presented in Sections 3.6.3-3.6.8, for capping, dredging, EMNR, and in-situ treatment) for Alternative B equals 212 acres.

d. **Missing Explanation of Decision Process for Areas without a Technology Score** – EPA states in Section 3.3.2.3 that there are instances when an area does not receive a score (an outcome when the areas does not achieve a threshold for any of the criteria). However, it is not explained what technology is assumed for those areas.

2. **Inclusion of Remediation Areas Downstream of Site** – This issue was discussed during the August 13, 2015 conference call. Figures 3.3-27 and 3.6-02 through 07 show remediation areas downstream of RM 1.9. This is inconsistent with Section 1 which states: "This FS focuses on approximately ten miles of the lower Willamette River from River Mile (RM) 1.9 (at the upriver end of the Port of Portland's Terminal 5) to RM 11.8 (near the Broadway Bridge), sometimes referred to as the "site" in this FS for

convenience." It is unclear if this is an error in the mapping only or carries through to assignments of technologies and various alternative quantity estimates. For example, Table 3.7-2 shows a total Site area (when the MNR and constructed areas are added together) of about 2,450 acres, which is larger than the Site area defined in Section 1 of EPA's revised FS (i.e., approximately 2,200 acres). This may be an unrelated inconsistency.

3. **Riverbank Assumptions -** EPA indicates "…caps will likely need to be placed on much of these banks and volumes are estimated by assuming that all the banks are currently vertical and need to meet a minimum slope of 1.7H:1V." Later text indicates a different requirement: "In this alternative, 9,624 lineal feet of riverbank are assumed to be laid back to a slope of 5H:1V and covered with either an armored cap or an engineered cap using beach mix or vegetation." So, it is unclear whether EPA is assuming slopes will be regraded to 1.7H:1V or 5H:1V or some combination of the two. Also, it is generally unclear whether riverbank quantities (e.g., Table 3.6-4) are included in "total" alternative quantity estimates (e.g., Table 3.7-2).

4. **Use of Silt Curtains and Sheetpiles** – Section 3.3.4.1 discusses dredging and excavation technologies and notes that "Silt curtains are assumed in water depths less than 50 feet and in areas where NAPL is not present… Areas of confirmed NAPL presence and Site bathymetry are presented on **Figure 3.3-37**." Figure 3.3-37 is entitled "Identified Bathymetry below 50 feet and NAPL Areas". (While this figure does not indicate what datum is being used for designating water depth, it appears that the NAVD88 datum is being used.) Thus, the text refers to water depths of 50 feet and the figure presents -50 foot elevation mark in the bathymetry. Given water levels are routinely above 0 feet NAVD88, the water depth associated with -50 foot elevation shown in the figure would typically represent between 54 and 70 feet of water depth depending on the particular river stage. According to Figure 3.3-37, areas of NAPL exist at elevations down to -40 foot elevation, which means NAPL exists at water depths of greater than 50 feet during the normal range of river stages.

5. **TPAH PRG of 970 ppb.** On Figure 3.3-02, the EPA uses a PRG for Total PAH of 970 ppb. This PRG is not listed in the most recent Table 2.2-1 Summary of Portland Harbor PRGs by RAO.

6. **Sheer Stress Figure 3.3-18:** EPA indicates, "Estimates of shear stress throughout the Site are shown on Figure 3.3-18." Figure 3.3-18 incorrectly presents bed shear stress for the 25-year event, not the 2-year event as indicated. It is unclear whether the correct or incorrect bed shear stress was used in the analysis.

7. **Separate NPL Sites with Final Remedies –** Two sentences in Section 3.3.2.1 contradict themselves: "Separate NPL sites within the Portland Harbor Site, Gould and McCormick and Baxter, where a final remedy has been implemented have been excluded from this analysis. This exclusion applies solely to the McCormick and Baxter site where the cleanup action included placement of a sediment cap." It is unclear whether Gould is included or not.